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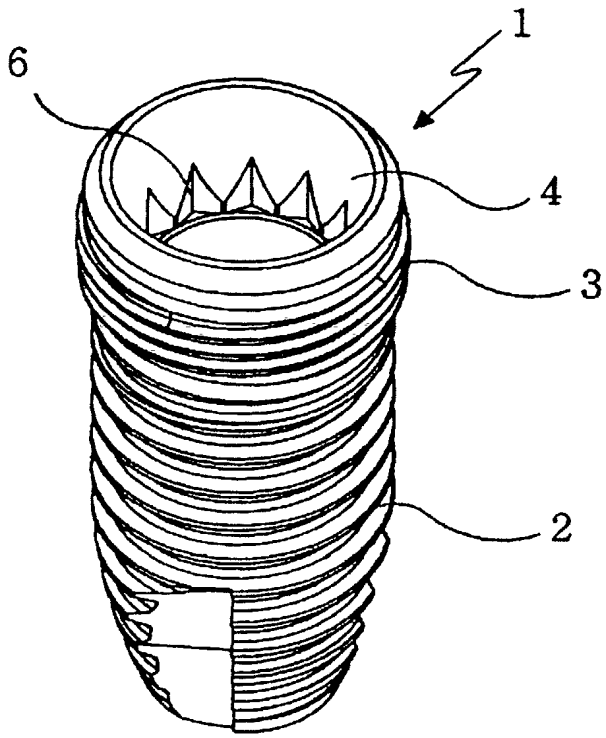

(57) Abstract: The present invention can strengthen a coupling capacity of a fixture and alveolar bone, prevent rotations of an abutment with respect to the fixture, and facilitate detachments of the fixture from the mount after fixing the fixture into the alveolar bone, in the upper slanted surface into the alveolar bone, in the upper slated surface of the fixture having first male threads on the outer circumferential surface thereof are formed second male threads having the same pitch as the first male threads and having at least two threads of band-type, and a spiral groove is formed which prevents vacuum formation in the contact surfaces between the fixture on the upper portion of which a slanted groove is formed and the mount having a slanted surface on which the slanted groove is in close contact.

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FIXTURE AND MOUNT FOR IMPLANT OPERATION

TECHNICAL FIELD

The present invention relates to a fixture and mount for implant treatments which strengthens a coupling force of a fixture and the alveolar bone, prevents the rotations of an abutment with respect to the fixture, and easily separates the mount after implanting the fixture into the alveolar bone.

More particularly, the present invention relates to a fixture and mount for implant treatments which can strengthen a coupling force with an increase of a coupling area of the fixture with respect to the alveolar bone, prevent the rotations of an abutment with an increase of a tight coupling force of the abutment with respect to the fixture, and prevent the fixture from freely moving when separating the mount from the fixture after placing the fixture into the alveolar bone.

BACKGROUND ART

In general, the implant treatments are to place into the alveolar bone an artificial tooth, that is, a fixture formed of screw-shaped titanium(Ti) of a body-friendly substance after drilling, tightly couple an abutment to the fixture if bone is united and hardened with the placed fixture ambient, and join molded prosthesis, the artificial tooth to the abutment.

When compared to the bridge treatment which is a most general teeth restoration approach, the implant treatments can be applied to only impaired parts without destructing adjacent teeth or ambient soft tissue or bone tissue, and the implant treatments is becoming a worldwide trend in restoring teeth since the implant is maintained and supported by bone tissue to continuously apply force to the bone tissue so that the absorption speed of the bone tissue is delayed and the chewing force can be restored to the same level as that of natural teeth as well as the implant can be esthetically restored nearly similarly to the natural teeth.

At this time, the fixture, which is referred to as the implant, is the most important member, and titanium which is a body-friendly substance is used for the fixture to enhance the unity capacity with the alveolar bone, the fixture is mounted

while forming screw threads in the alveolar bone when mounted in a hole punched in the alveolar bone since the fixture has screw threads formed across the upper side and lower side of the outer side thereof, and, after mounting, the fixture can be united with and firmly fixed to the ambient bone due to the characteristics of the substance itself.

In the meantime, after coupling the fixture to a mount by a screw detachably screw-coupled to the fixture in order to place the fixture into the alveolar bone, the upper side of the screw is inserted in a hand piece(not shown) to place the fixture into the alveolar bone with a strong rotation force.

At this time, a hole formed in advance in the alveolar bone for the fixture placement is formed smaller in diameter than the fixture screw threads, and, since the fixture is placed while forming screw threads in the alveolar bone, a torque is generated to maintain a vacuum state due to a strong contacting force produced between the inner surface of the fixture and the outer surface of the mount during the placement of the fixture into the alveolar bone.

As stated above, in case that a strong vacuum state is produced between the fixture and the mount, when separating the mount from the fixture after placing the fixture into the alveolar bone, the fixture is pulled out of the alveolar bone together with the mount or severely moves, causing a problem that the implant treatments fail.

The alveolar bone consists of a compact bone formed to have a predetermined thickness from the surface and a spongy bone formed inside the compact bone, whereas the fixture has screw threads formed in the same shape across the upper side and the lower side of the outer surface thereof, and the contact portion of the compact bone does not have screw threads formed, so the portion substantially coupled corresponds to only the portion of the spongy bone as weak as sponge, causing a problem that the fixture can move after implant treatments with a weak coupling force of the fixture and bone destructs without any stimulus to the compact bone.

In considering the above, in case of forming a tapered outer surface of the fixture contacting with the compact bone, forming a screw groove inside the outer surface to tightly contact the fixture to the compact bone, and increasing a contact

area thereof, a coupling force is more increased than in a structure that screw threads are not formed in a portion of the fixture contacted with the compact bone, but the strength of a portion on which the compact bone is contacted is deteriorated, causing a problem that the fixture can be impaired.

Further, there exists a problem that an area contacting with the compact bone is not increased with a spiral groove formed on the outer surface of the fixture, a problem that a coupling force of the fixture is poor since the spiral groove of the upper side of the fixture and the compact bone are not screw-coupled but just contact-coupled due to a difference of pitches formed in the spiral groove and the outer surface, and a problem that the bone of the contact portions is destructed since there is no continuous stimulus to the compact bone.

In the meantime, fixtures are classified into an internal type and an external type according a position coupled with an abutment for supporting prosthesis, and, in case of the external type, the fixture is formed angled for the anti-rotation of the prosthesis and formed or assembled in one body with a structure(referred to as 'hexa' due to a hexagonal structure) having a spiral groove in its center on the upper side thereof, and an abutment is covered and assembled on top of the structure.

In case of the internal type fixture, a groove is formed papered from the center of the upper side to the inner lower side of the fixture, a spiral groove is continuously formed below the lower side of the groove, and a hexa is formed on the upper side or the lower side of the groove to insert and assemble an abutment inside the groove, and, in case that the fixture is an external type, lots of portions are cut open upon the second operation for coupling an abutment and dangerous situations exist for germs to penetrate into the cut-open portions, so it is a trend to prefer the internal type fixture.

The internal type fixture has a groove formed tapered toward its lower side to enhance a tight contact between the abutment and the internal wall of the fixture, so the hexa for the anti-rotation of the abutment is located adjacent to the internal spiral groove or in the inlet side of the topmost part.

In case that the hexa is positioned near the spiral groove, the tight contact of the internal wall of the fixture and the abutment are enhanced, but the coupling

clearance is increased upon coupling the hexa and the abutment, so there exists a problem that the abutment can move.

However, in case that the hexa is positioned at the inlet side of the topmost part, the coupling clearance between the hexa and the abutment can be reduced, but the tight contact between the internal wall of the fixture and the abutment is deteriorated, so there exists a problem that soft tissue or bone tissue can penetrate through a gap between the fixture and the abutment.

DISCLOSURE OF THE INVENTION

In order to solve the above problem, it is an object of the present invention to provide a fixture for implant treatments which can strengthen a coupling force due to an increase of a contact area of the fixture with respect to alveolar bone and prevent bone destruction with continuous stimulus to the alveolar bone.

It is another object of the present invention to provide a fixture for implant treatments which can prevent an abutment from rotations due to an increased tight contact of the abutment with respect to the fixture.

It is yet another object of the present invention to provide a mount for implant treatments which can easily separate the mount from a fixture after the placement of the fixture into alveolar bone so as to prevent the fixture from movements.

In order to achieve the above objects, in a fixture for implant treatments having a slanted surface formed downwardly slanted on an upper side of an outer surface contacting with alveolar bones, a first male screw part formed on the outer surface below the slanted surface, a slanted groove formed on the upper side in order for an abutment to be coupled, and a female screw part formed below the slanted groove, a fixture for implant treatments according to the present invention includes a second male screw part formed on the slanted surface and having the same pitch as the first male screw part, the second male screw part having at least two threads formed in a band shape.

At this time, according to a preferred embodiment, an angled groove for preventing the abutment from rotations is formed in circle in the middle of the slanted groove, and a slanted angle of the slanted groove is formed in 20 ~ 25

degrees.

Further, the first male screw part has threads each formed a slanted angle larger in an upper side thereof than in a lower side thereof with reference to the center of the cross section thereof, and a ceramic coating layer having chemical components and structures similar to the alveolar bone is formed on the male screw part of the fixture contacting with the alveolar bone.

In order to solve the above objects, in a mount for implant treatments including a fixture having a male screw part formed on an outer surface, a slanted groove formed on an upper side, and a female screw part formed below the slanted groove; and a screw detachably coupled to the fixture through a mount to which a lower side of the slanted groove is coupled and placing the fixture into the alveolar bone, a mount for implant treatments according to the present invention includes a slanted surface formed on a lower side of the outer surface of the mount to be tightly contacted with the slanted groove, a spiral groove formed on the slanted surface for preventing vacuum from being formed in an interface between the fixture and the mount, and an extension part formed to be vertically extended on the upper side of the slanted surface.

At this time, according to the preferred embodiment, a male screw part corresponding to the female screw part of the fixture is formed below the screw to be extended in a length enough to be coupled to the fixture through the mount, and an female screw part corresponding to the male screw part of the screw is formed in a lower side of a through hole of the mount.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and other features of the present invention will become more apparent by describing in detail a preferred embodiment thereof with reference to the attached drawings, in which:

Fig. 1 is a perspective view for showing a fixture for implant treatments according to an embodiment of the present invention;

Fig. 2 is a cross-sectioned view for showing a fixture for implant treatments according to an embodiment of the present invention;

Fig. 3 is a view for showing a state of placing into the alveolar bone a

fixture for implant treatments according to the present invention;

Fig. 4(a) is a view for showing a state of coupling an abutment having no hexa to a fixture for implant treatments according to the present invention;

Fig. 4(b) is a view for showing a state of coupling an abutment having a hexa to a fixture for implant treatments according to the present invention;

Fig. 5 is a cross-sectioned view for showing a mount assembly for implant treatments according to the present invention;

Fig. 6(a) is a perspective view for showing a mount for implant treatments according to the present invention;

Fig. 6(b) is a cross-sectioned view for showing a mount for implant treatments according to the present invention; and

Fig. 7 is a perspective view for showing a screw fixing a mount for implant treatments to a fixture according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Hereinafter, an embodiment of the present invention is described in detail with reference to the accompanying drawings.

Fig. 1 is a perspective view for showing a fixture for implant treatments according to an embodiment of the present invention, Fig. 2 is a cross-sectioned view for showing a fixture for implant treatments according to an embodiment of the present invention, Fig. 3 is a view for showing a state of placing into the alveolar bone a fixture for implant treatments according to the present invention, Fig. 4(a) is a view for showing a state of coupling an abutment having no hexa to a fixture for implant treatments according to the present invention; and Fig. 4(b) is a view for showing a state of coupling an abutment having a hexa to a fixture for implant treatments according to the present invention.

As shown in Fig. 1 to Fig. 4(b), in a fixture for implant treatments according to the present invention, a surface is downwardly formed slanted 3 degrees on the outer upper side of the fixture 1 contacting with the alveolar bone J, a first male screw part 2 are formed on the outer surface of the fixture 1 below the slanted surface, a groove 4 is formed tilted on the upper side thereof in order for an abutment A to be coupled, and a female screw part 5 are formed below the tilted

groove 4, and detailed descriptions on structures and operations of which are omitted since they are known in the art to which the present invention pertains.

Second male threads 3 having the same pitch as the first male screw part 2 are formed on the slanted surface of the fixture 1, the second male screw part 3 has at least two threads formed in a band shape, a angled groove(referred to as 'hexa') 6 is formed in circle which prevents the rotations of an abutment A in the middle of the slanted groove 4 formed in a slanted angle of 20° ~ 25°.

At this time, the first male screw part 2 has a slanted angle formed larger on its upper side than on its lower side thereof with reference to the center of its cross section in order to increase a contact area with the alveolar bone J for an enhanced supporting force, scatter a load and to lead the first and second male screw parts 2 and 3 of the fixture 1 contacting with the alveolar bone J to stable and firm biological settlements with respect to the alveolar bone J, and a coating layer 7 is formed with ceramics and so on which have chemical components and structures similar to the alveolar bone J not to produce adverse effects and chemical and/or biochemical reactions.

Hereinafter, descriptions is made in more detail on a process for placing a fixture for implant treatments according to the present invention with respect to the accompanying drawings.

As shown in Fig. 3, a drill(not shown) is used to form a small hole in the alveolar bone the diameter of which is smaller than that of the fixture 1, and a hand piece is used to place the fixture 1 while forming the first and second male screw parts 2 and 3 in the alveolar bone J.

The alveolar bone J is formed with a compact bone J' formed in a certain thickness from the surface thereof, when viewed in its cross section, and a spongy bone J" having a soft tissue which is formed inside the compact bone J', so that, when the fixture 1 is placed into the alveolar bone, the first male screw part 2 becomes contacted with the spongy bone J" and the second male screw part 3 formed in band on the slanted surface of the fixture 1 becomes contacted with the compact bone J'.

Accordingly, the spongy bone J" of soft tissue becomes contacted with the first male screw part 2 of the fixture 1 to increase a contact area so that its

coupling force can be strengthened, and the compact bone J' of tight tissue becomes contacted with the second male screw part 3 of the fixture 1 for minute and secure couplings.

Particularly, the second male screw part 3 having at least two or more threads formed in a band shape increases an contact area with the compact bone J' to enhance a coupling capacity, and, after the implant treatment is completed, chewing food can continuously stimulate the alveolar bone J to prevent bone destructions.

Further, the second male screw part 3 of the fixture 1 has the same pitch as the first male screw part 2 so that the entire alveolar bone is coupled with the fixture 1 in a screwed type to increase its coupling force, so a biting force after implant treatments can be restored to that of natural teeth.

Further, the second male screw part 3 of the fixture 1 is protruded outside the upper slanted surface so that a coupling area with the compact bone J' can be increased, the thick upper part of the fixture 1 complements a strength of itself so that it can be prevented to fracture the upper side contacting with the compact bone J' in implant treatments, the compact bone J' becomes more tightly contacted with the slanted part of the fixture 1 as the fixture 1 is placed deeper so that a perfect sealing state is achieved, which can completely exclude the possibility of soft tissue blending.

In the meantime, the groove 4 is formed 20° ~ 25° slanted in the upper side of the fixture 1 and the female screw part 5 is formed below the slanted groove 4, so the outer surface of the abutment A is formed to have a slant angle similar to that of the slanted groove 4, so that, in case of coupling with the abutment A, the contact surfaces of the fixture 1 and the abutment A become more tightly contacted to obtain a perfect sealing.

Further, for an anti-rotation function of the abutment A, the angled groove(hexa) 6 having 12 vertices, which is a shape obtained from overlying two regular hexagons to have vertices in equal spacing on a virtual circumscribed circle, is formed in the middle of the slanted groove 4, so that the fixture 1 can be applied to both the abutment A having a hexa formed on the outer surface thereof as shown in Fig. 4(b) the type of which is to insert and screw the hexa of the

abutment into the hexa of the fixture 1 from the top of it, and the abutment A having no hexa formed as shown in Fig. 4(a) wherein the anti-rotation can be implemented even in case that a hexa structure is not formed for perfect sealing.

At this time, the hexa 6 is formed in the middle of the slanted groove 4 to have an appropriate supporting force, and, at the same time, to increase a contact area between the outer surface of the abutment A and the inner wall of the fixture 1 for the enhancement of the tight contact, and a coupling clearance between the respective hexas becomes relatively smaller than in case that the hexa 6 is located in the lower side so movements after coupling the abutment A can be basically prevented.

In the meantime, as shown in Fig. 2, the first male screw part 2 of the fixture 1, when viewing in the cross section, has a slanted angle larger on its upper side 2a than on its lower side 2b so that, when the fixture 1 is meshed with the alveolar bone J, bone portions are meshed on a larger area than when using a general screw, to thereby enhance a coupling force between the fixture 1 and the alveolar bone J further, and the lower part 2b becomes thicker in the first male screw part 2 than the upper side 2a so that scattering force becomes easier.

Further, the surfaces of the first and second male screw parts 2 and 3 of the fixture 1 placed in the alveolar bone J is heat-treated under oxygen environments within 2 ~ 3 hours to form on the surfaces of the first and second male screw parts 2 and 3 of the fixture 1 the coating layer 7 of a body-friendly substance such as ceramics, metallic oxide, and so on, which has chemical components and structures similar to the alveolar bone J, so that ambient bones can be rapidly adapted with respect to the fixture 1, the bones and fixture 1 can be firmly coupled, harmful reactions with body tissue can be suppressed, and a predetermined strength can be secured.

Fig. 5 is a cross-sectioned view for showing a mount assembly for implant treatments according to the present invention, Fig. 6(a) is a perspective view for showing a mount for implant treatments according to the present invention, Fig. 6(b) is a cross-sectioned view for showing a mount for implant treatments according to the present invention, and Fig. 7 is a perspective view for showing a screw fixing a mount for implant treatments to a fixture according to the present

invention.

As shown in Fig. 5 to Fig. 7, a mount for implant treatments according to the present invention includes a fixture 10 having a male screw part 10b formed on the outer surface, a slanted groove 10c formed on the upper side, and a female screw part 10a formed below the slanted groove 10c; and a screw part 30 detachably coupled to the fixture 10 through a mount 20 the lower side of which is coupled to the slanted groove 10c, and implanting the fixture 10 into the alveolar bone, which are known in the art to which the present invention pertains so that detailed descriptions on their structures and operations will be omitted.

A slanted surface 24 is formed on the lower side of the outer surface of the mount 20 to be tightly contacted to the slanted groove 10c, a spiral groove 21 for preventing vacuum formation in the interface between the fixture 10 and the mount 20 is formed on the slanted surface 24, and an extension part 22 is formed to be vertically extended on the upper side of the slanted surface 24 so that the mount 20 is separated with respect to the slanted groove 10c to be easily pulled out.

At this time, a male screw part 31 corresponding to the female screw part 10a of the fixture 10 is formed on the upper side of the screw 30 extending in a length enough to be coupled to the fixture 10 through the mount 20, and a female screw part 23 corresponding to the male screw part 31 of the screw 30 is formed on the lower side of the through hole 20a of the mount 20.

Hereinafter, operations of the mount for implant treatments according to the present invention will be described in more detail with reference to the accompanying drawings.

As shown in Fig. 5, in coupling the screw 30 to the fixture 10 in a state that the mount 20 is inserted in order to place the fixture 10 into the alveolar bone, when the male screw part 31 of the screw 30 is inserted into the through hole 20a of the mount 20 and turned, the male screw part 31 of the screw 30 is screw-coupled to the female screw part 23 of the mount 20 and the lower side of the screw 30 gradually comes out of the lower side of the mount 20, and, when the male screw part 31 of the screw 30 completely comes off the female screw part 23 of the mount 20 and comes out of the lower side of the mount 20, the screw-coupling of the male screw part 31 of the screw 30 and the female screw part 23 of

the mount 20 is released.

At this time, when coupling the male screw part 31 of the screw 30 to the female screw part 10a of the fixture 10, the mount 20 makes about one half turn, namely, about a 180° turn from an initial position to couple the screw 30, and the slanted surface 24 slantedly formed on the lower side of the outer surface of the mount 20 is contacted to the slanted groove of the fixture 10 so that the position is determined by the screw 30.

The upper side of the screw 30 is fixed to a hand piece not shown and the fixture 10 is implanted into the alveolar bone, and, after placing the fixture 10, the hand piece is turned in a opposite direction to pull out the screw 30 and the mount 20 from the fixture 10.

At this time, a vacuum state in the interface between the fixture 10 and the slanted groove of the mount 20 is not formed by the spiral groove 21 formed in the slanted surface 24 of the mount 20, and, when the screw 30 comes out of the upper side of the fixture 10 so that the male screw part 31 of the screw 30 and the female screw part 23 of the mount 20 are in contact to each other, it becomes a state about one half rotated from an initial position at which the mount 20 is coupled so that the initial positions of the male screw part 31 of the screw 30 and the female screw part 23 of the mount 20 do not match with each other and then the male screw part 31 of the screw 30 hits the bottom of the mount 20.

Accordingly, the mount 20 is instantly spaced from the slanted groove of the upper side of the fixture 10, and, when the screw 30 comes out and hits the bottom of the mount 20, the mount 20 is spaced from the slanted groove on the upper side of the fixture 10 by an extension part 22 vertically extended on the upper side of the slanted surface 24 on the lower side of the mount 20 to move upwards, so that the mount 20 is easily separated from the fixture 10.

INDUSTRIAL APPLICABILITY

As stated above, the present invention can strengthen a coupling force with an increase of a contact area of the fixture with respect to the alveolar bone, continuously stimulate the alveolar bone to prevent bone destructions, and prevent the rotations of an abutment with a less coupling clearance of the abutment with

respect to the fixture.

Further, the present invention has an effect that can prevent the movements of the fixture by easily separating the mount from the fixture after placing the fixture into the alveolar bone.

Although the preferred embodiment of the present invention has been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiment, but various changes and modifications can be made within the spirit and scope of the present invention as defined by the appended claims.

CLAIMS

What is claimed is:

1. A fixture for implant treatments having a slanted surface formed downwardly slanted on an upper side of an outer surface contacting with alveolar bones, a first male screw part formed on the outer surface below the slanted surface, a slanted groove formed on the upper side in order for an abutment to be coupled, and a female screw part formed below the slanted groove, characterized in that a second male screw part is formed on the slanted surface and has the same pitch as the first male screw part, and the second male screw part has at least two threads formed in a band shape.

2. The fixture as claimed in claim 1, wherein an angled groove for preventing the abutment from rotations is formed in circle in the middle of the slanted groove.

3. The fixture as claimed in claim 1, wherein the first male screw part has threads each formed a slanted angle larger in an upper side thereof than in a lower side thereof with reference to the center of the cross section thereof.

4. The fixture as claimed in claim 1 or claim 2, wherein the a slanted angle of the slanted groove is formed in 20 ~ 25 degrees.

5. The fixture as claimed in claim 1, wherein a ceramic coating layer having chemical components and structures similar to the alveolar bone is formed on the male screw part of the fixture contacting with the alveolar bone.

6. A mount for implant treatments including a fixture having a male screw part formed on an outer surface, a slanted groove formed on an upper side, and a female screw part formed below the slanted groove; and a screw detachably coupled to the fixture through a mount to which a lower side of the slanted groove is coupled and placing the fixture into the alveolar bone, characterized in that a slanted surface is formed on a lower side of the outer surface of the mount to be

tightly contacted with the slanted groove, a spiral groove for preventing vacuum from being formed in an interface between the fixture and the mount is formed on the slanted surface, and an extension part is formed to be vertically extended on the upper side of the slanted surface.

7. The mount for implant treatments as claimed in claim 6, wherein a male screw part corresponding to the female screw part of the fixture is formed below the screw to be extended in a length enough to be coupled to the fixture through the mount, and an female screw part corresponding to the male screw part of the screw is formed in a lower side of a through hole of the mount.

Fig. 1

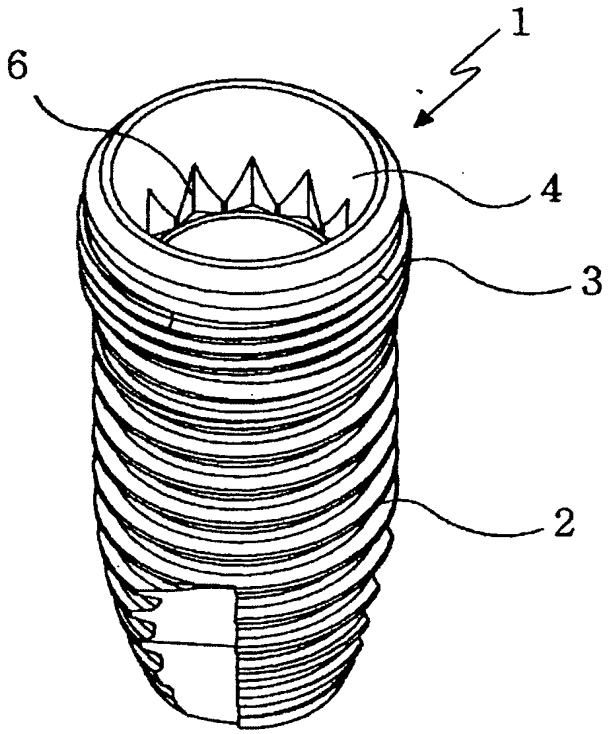


Fig. 2

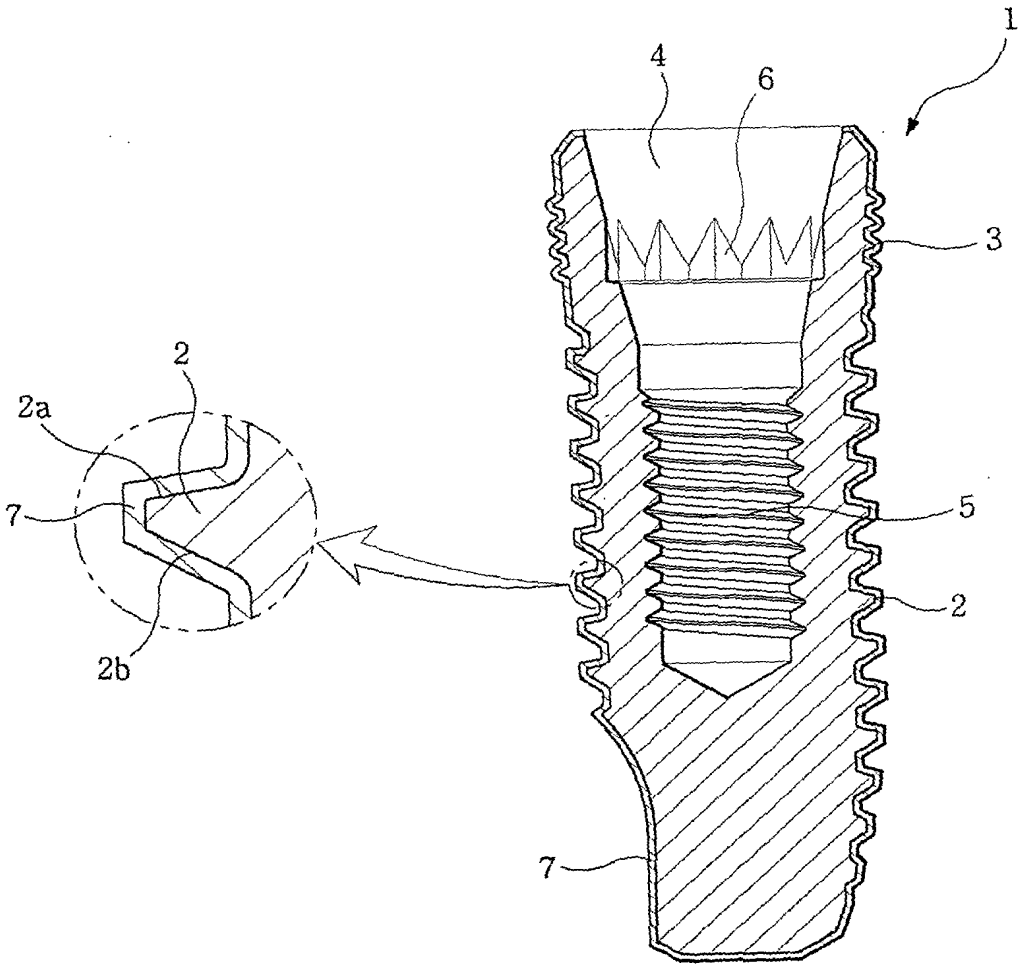


Fig. 3

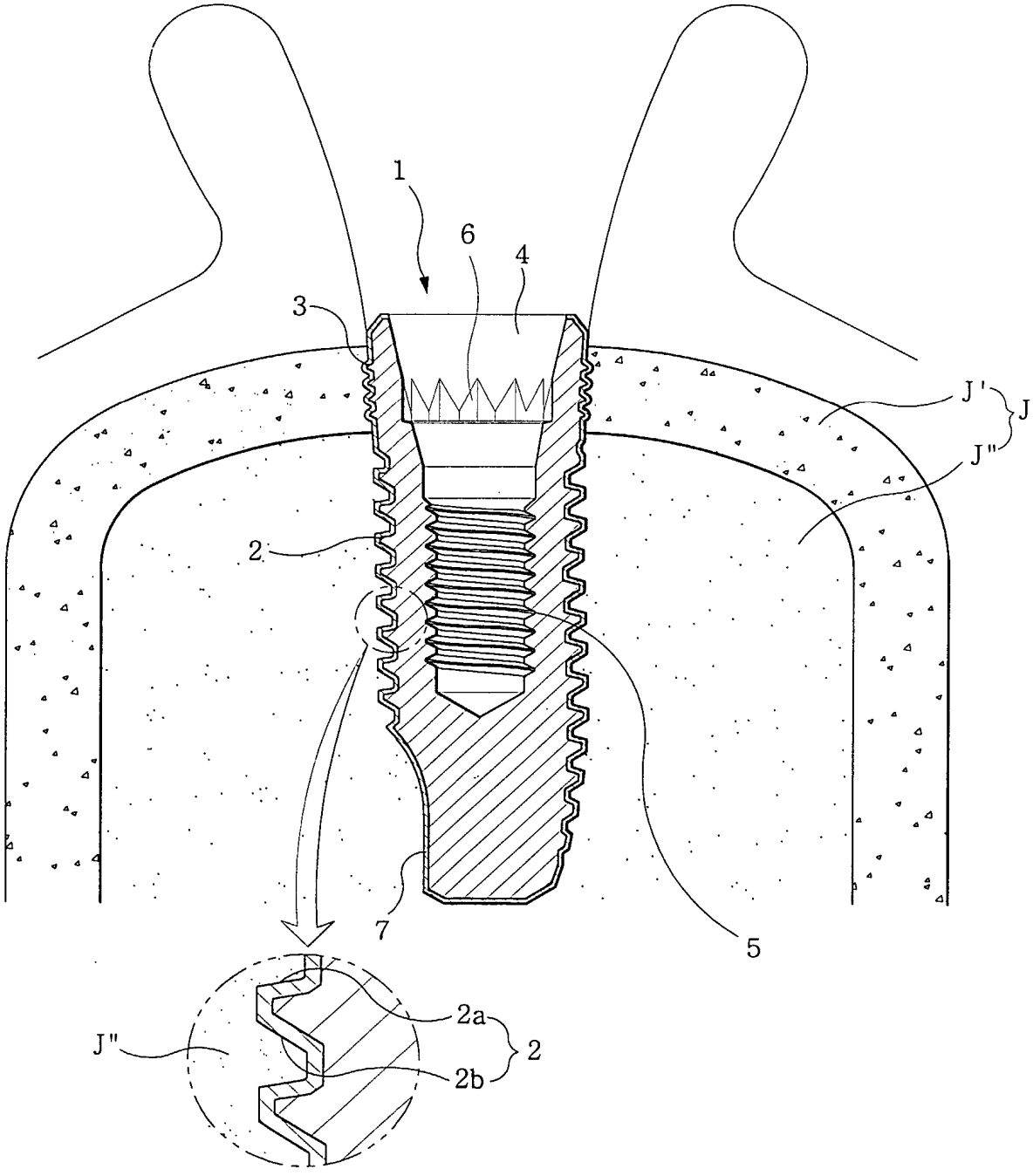


Fig. 4a

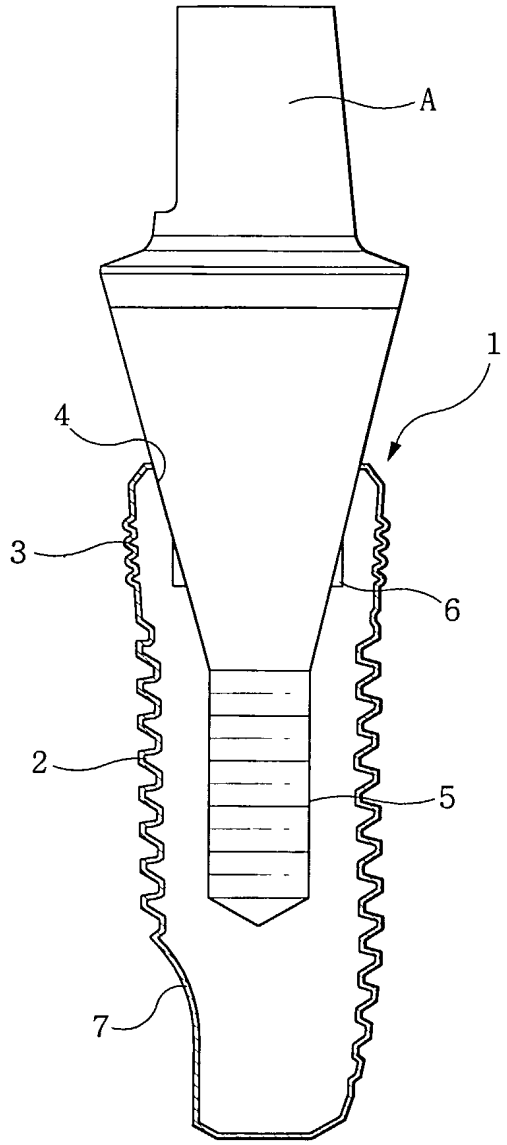


Fig. 4b

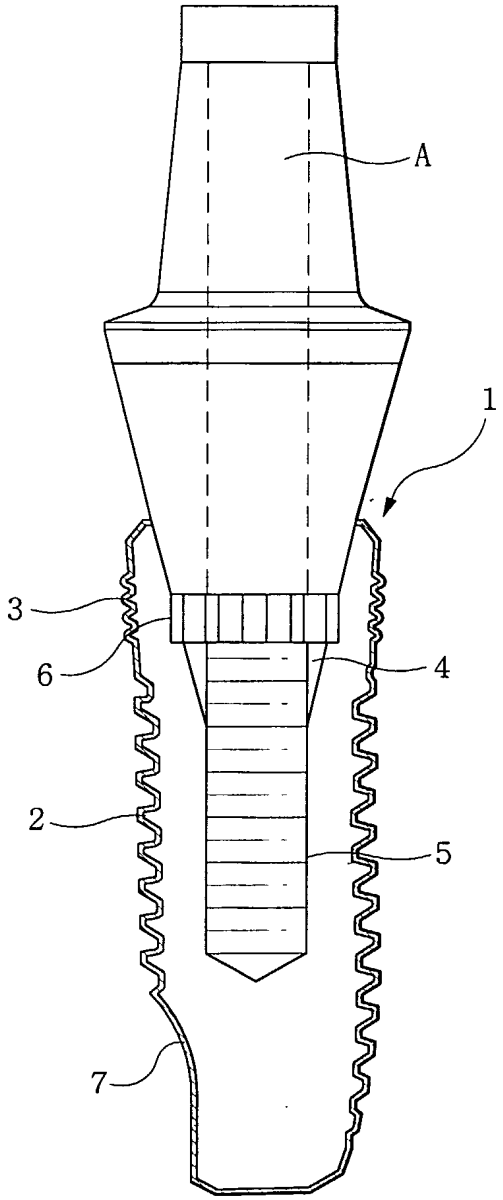


Fig. 5

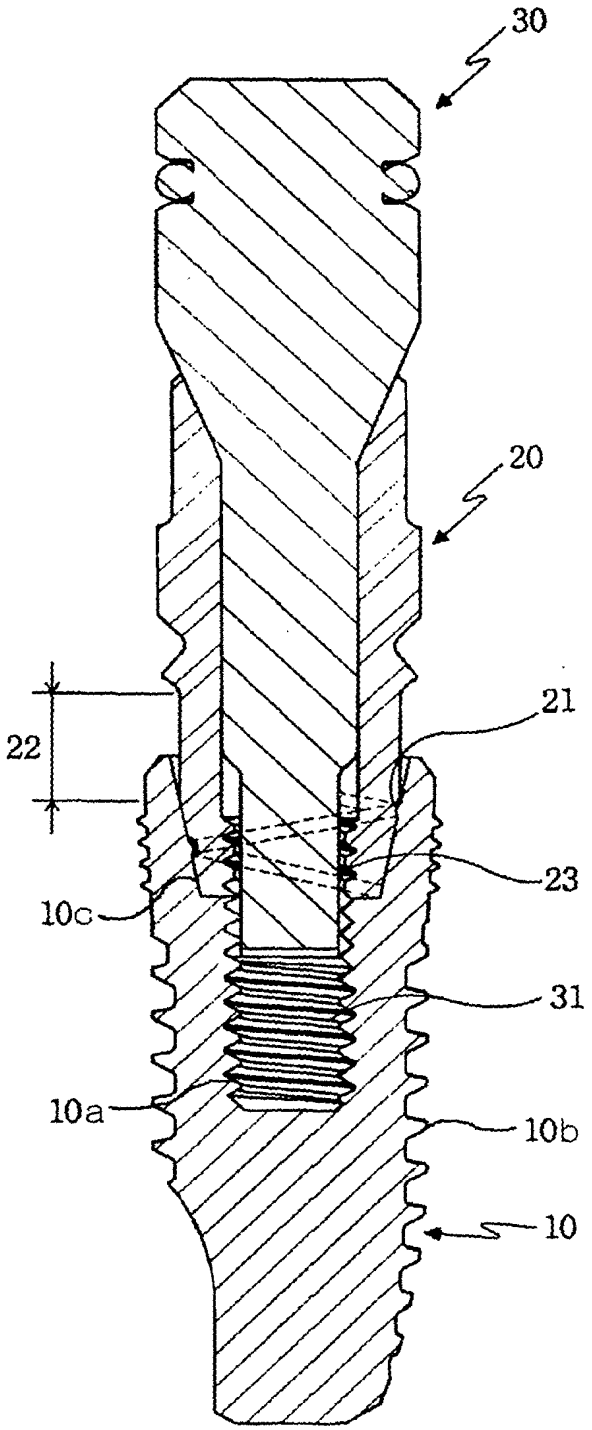


Fig. 6a

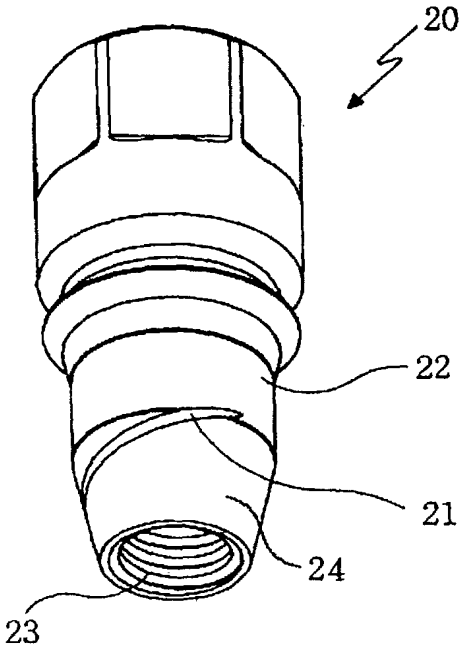


Fig. 6b

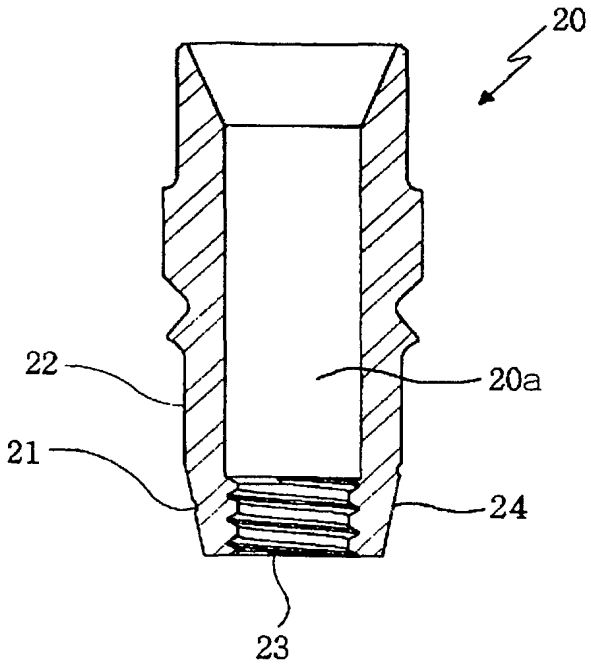
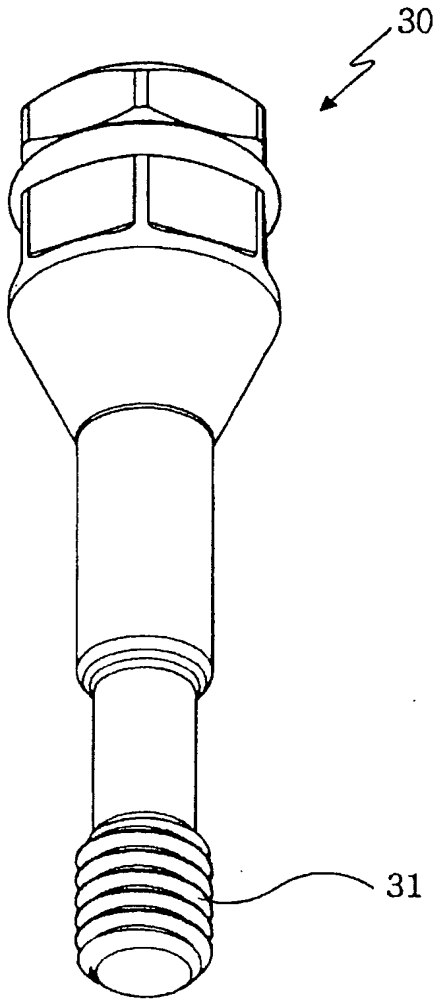


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR02/01863

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A61C 8/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 A61C;

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Koreans Patents and applications for inventions since 1975
Koreans Utility models and applications for Utility models since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 2000-56128 A (PILL-HOON JUNG) 15 SEPTEMBER 2000 see entire document.	1
A	US 6102702 A (AUBREY CLINTON FOLSOM, JR.) 15 AUGUST 2000 see entire document.	1
A	WO 9917676 A3 (IMPLANT INNOVATIONS, INC.) 29 JULY 1999 see entire document.	1
A	US 5106299 A (KAMBIZ M. GHLILI) 21 APRIL 1992 see entire document.	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevence
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 FEBRUARY 2003 (12.02.2003)	17 FEBRUARY 2003 (17.02.2003)

Name and mailing address of the ISA/KR
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR02/01863

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20000-56128 A	15-09-2000	US 6332778 B1	25-12-2001
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US 5106299 A	21-04-1992	NONE	